In re Patent Application of:
CHAPPAZ
Serial No. **09/855,734**
Filing Date: **MAY 15, 2001**
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REMARKS

Applicant would like to thank the Examiner for the thorough examination of the present application, and for correctly indicating as allowable the subject matter of dependent Claims 13, 20, 27 and 34. The arguments supporting patentability of the claims are presented in detail below.

I. The Claims Are Patentable

The Examiner rejected independent Claims 11, 18, 25 and 32 over the Ramesh et al. patent. The present invention, as recited in independent Claim 11, for example, is directed to a process for estimating an impulse response of a transmission channel defined by a sender, a receiver, and means of propagation extending therebetween.

The process comprises calculating a first estimate of the impulse response of the transmission channel considered as a whole. The first estimate is corrected independently of information being transmitted based upon an impulse response of the sender and an impulse response of the receiver that is known. This is done to obtain a corrected final estimate of the impulse response of the transmission channel. The process in accordance with the present invention may advantageously provide an improvement to channel estimation which can be applied equally well to learned estimates (i.e., those with training sequences) and blind estimates (i.e., those with no training sequences).

Independent method Claim 18 is similar to independent method Claim 11, but further recites that correcting the first estimate comprises calculating coefficients of the corrected final estimate by multiplying

coefficients of the first estimate by a matrix whose
coefficients are predetermined and representative of the
impulse responses of the sender and of the receiver.

Independent device Claim 25 is directed to a
receiver comprising first and second estimation circuits for
performing the process as defined in independent method Claim
11. Independent Claim 32 is directed to a computer-readable
medium for performing the process as defined in independent
method Claim 11.

Referring now to the Ramesh et al. patent, a method
for estimating an impulse response of a transmission channel
is disclosed. As illustrated in FIG. 1, the transmission
channel **40** is formed to include the communication channel **16**
along with the filters **26** and **34**. The method includes dividing
the intersymbol interference into channel introduced component
portions and filter-induced component portions (column 6,
lines 14-16). In particular, the Examiner makes reference to
the equation in column 7, line 56, which is the channel
impulse response of a signal received by the receiver.

The Applicant respectfully submits that the Examiner
has mischaracterized Ramesh et al. More particularly, in the
two embodiments illustrated in FIGS. 2 and 3 of Ramesh et al.,
it is not possible to distinguish an estimation followed by an
improvement of the impulse response between the output of the
sampler **56** and the output of the comparator **74**. Instead,
Ramesh et al. performs several correlations between the sample
signal and several reference vectors (coefficient C_k).

In Ramesh et al., an estimation of the impulse
response using the known transmission/reception elements is
directly obtained, i.e., within a <u>single</u> step. The Examiner

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references column 8, lines 23-27 and FIG. 2 in Ramesh et al.,
but this still fails to disclose the claimed invention.

Reference is directed to column 8, lines 11-17 of
Ramesh et al., which provides:

> "In the Embodiment of FIG. 2, the sampling
> position at which an optimal correlation
> is detected is chosen, and the
> corresponding value of a is determined
> from the correlation.
>
> In the embodiment illustrated in FIG. 3,
> oversampling is not utilized. Instead, a
> receive signal is sampled at a rate of one
> sample per symbol. In this embodiment,
> the memory elements **88-1** through **88-n**
> store multiple models of C_k."

The result of the correlations made with the several
versions of coefficient C_k which are stored in the elements **88-1** through **88-n** permits determination of both optimal sampling
position and the values of the channel coefficients a_0 and a_1.
Once these coefficients are known, the search impulse response
is obtained by a combination with the selected version of
coefficient C_k. In other words, the optimal impulse response
is <u>directly</u> obtained. The Applicant submits that Ramesh et
al. fails to distinguish the following two steps, i.e., a
calculation of a first estimate of the impulse response of the
transmission channel as a whole, and a correction of the first
estimate independently of the information being transmitted,
as recited in independent Claim 11.

Further, as explained above, Ramesh et al. fails to
disclose a correction of the first estimate independently of
information being transmitted. On the contrary, in both of the

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disclosed embodiments, Ramesh et al. needs to compulsorily know several pilots or synchronization symbols. Ramesh et al. discloses that the stored data words are representative of the synchronization symbols.

Therefore, the Applicant submits that independent Claim 11 is patentable over the Ramesh et al. patent. Independent Claims 18, 25 and 32 are similar to independent Claim 11, and it is also submitted that these claims are patentable over the Ramesh et al. patent. In view of the patentability of the independent claims as discussed above, it is submitted that their dependent claims, which recite yet further distinguishing features, are also patentable over the prior art. Thus, these dependent claims require no further discussion herein.

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CONCLUSION

In view of the arguments provided herein, it is submitted that all the claims are patentable. Accordingly, a Notice of Allowance is requested in due course. Should any minor informalities need to be addressed, the Examiner is encouraged to contact the undersigned attorney at the telephone number listed below.

Respectfully submitted,

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MICHAEL W. TAYLOR
Reg. No. 43,182
Allen, Dyer, Doppelt, Milbrath
   & Gilchrist, P.A.
255 S. Orange Avenue, Suite 1401
Post Office Box 3791
Orlando, Florida 32802
407-841-2330

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